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illuminations by rendering a piece of platinum wire incandescent by galvanic current.

Besides the above rooms and instruments, there is a vacant turret on the roof of the church, which is used on the site for a small telescope by Cauchoix, employed for open-air observations; and within the Observatory are stored various theodolites, toises, surveying instruments, quadrants, and chronometers.

There is a complete collection of instruments in use for meteorological observations; and the precaution is taken of always having a duplicate of each in store to prevent interruption of the records by the derangement or breakage of thermometers. A zinc-ball is also in regular use; for which the mean-time clock in the transit-room is used, and by which the instant of noon is daily signalled to the city.

In the Library of the Observatory are kept all the books and maps in frequent use; and generally the more modern works belonging to the Observatory, while the more ancient works, forming a rich collection, are preserved near at hand in the Library of the College.

A very beautiful copy of a drawing of the large lunar crater, *Copernicus*, executed with great labour and success, was also presented to the Society at the same time by Professor Secchi, and greatly admired by those members of the Society, who were present on the occasion when it was laid on the table.

Catalogue of 53 *Variable Stars, with Notes.* By Norman Pogson, Assistant at the Radcliffe Observatory. (*From* Vol. XV. *of the Radcliffe Observations.*)

It has been stated at p. 177, that this Catalogue was prepared by Mr. Pogson during his leisure hours, and was originally intended solely for his own private use. So complete a compendium of the results which have been established in this interesting branch of astronomy, cannot fail to be acceptable to astronomers generally. It contains the mean place of each star for the year 1860, with the annual variations in right ascension and north polar distance; the magnitudes at maxima and minima; the mean period in those cases wherein such has been ascertained; the discoverer of variability; and, lastly, the date of discovery. The notes appended to the Catalogue contain a variety of useful details. Of the variable stars which have been discovered by Mr. Pogson himself, one of the most interesting is the star 24 *Ceph.* (*Hev.*), which has been confounded by Lalande and other astronomers with λ *Ursæ Minoris*, but which Mr. Pogson has shown to be in reality identical with No. 3402 of the Astronomer Royal's edition of Groombridge's Catalogue. We extract the following from Mr. Pogson's Notes :—

" 36. *S. Ophiuchi.* This star was first seen at the Radcliffe Observatory, as a 10th mag. on 1854, May 6. In June 1853, I had carefully constructed and revised this portion of a manuscript chart, taking in all stars down to the 12th inclusive, and am sure, that if visible at all, at that time it must have been too faint for insertion in my chart. The third night after its recognition it was very little under a 9th, after which it rapidly faded away, no trace remaining by the middle of June. It continued invisible through July, August, and September, of that year. In April and May 1855 it was still invisible, and therefore less than 13·5, my limit of vision with the equatoreal of 7·2 inches aperture. On June 9 it reappeared, strictly as a *minimum visibile.* It must have attained a maximum some time in August; for on September 10 and 12 it had again diminished to the 11th. On 1856, March 7 and 11, it was 9·3. Hence the period is probably about 7 months. The colour when brightest was bluish white; no redness was remarked at any time.

"Near *S. Ophiuchi* we find one of the most remarkable vacuities in this hemisphere—an elliptic space of about 65′ length in the direction of R.A. and 40′ width, in which there exists *no* star larger than the 13th magnitude. The centre of this curious blank is situated in R.A. 16^{h} 18$\frac{1}{4}^{m}$, N.P.D. 160° 40′, and it is impossible to turn a large telescope in that direction, and if I may so express it, view such black darkness, without a feeling that we are here searching into the remote regions of space, far beyond the limits of our own sidereal stratum."

"42. 2896 *Gr.* This star, which is in the same field of view with *θ Cygni*, was observed 4 times by Groombridge in 1811, and recorded by him as of 7·5 mag. It was frequently looked for with the meridian instruments of the Radcliffe Observatory between 1841 and 1845, but not seen. In Argelander's Zone 21, observed on August 16, 1841, we find the two bright stars preceding, but not this one. On August 27, 1852, having set for its place with the transit instrument, I was surprised to find it bright, and easily observable with full illumination, certainly not much under the 7th mag. I have since obtained upwards of 120 comparisons on different nights. A graphic projection furnished the period given in the table, which, though only approximate, agrees very well with the dates of Groombridge's observations. The curve of variation is remarkably steady in its march. The increase from 13·5 mag. to maximum is performed in less than 100 days, but the diminution between the same limits occupies above 200 days. It is under 13·5, and therefore invisible in our equatoreal, for about 100 days; but I have good reason to infer from my projection that it does not go below the 14·3 mag., in which case it would never be quite lost to a 10-inch object-glass. At maximum it is of a dull red colour, but when near its vanishing point is perfectly free from the hazy appearance presented at such times by most other variable stars. A well-watched maximum occurred on 1854 Nov. 1, and another in Dec. 1855. A small star (10th mag.) 1′·5 np. 2^{s}, being equally affected by the brightness of *θ Cygni*, is the best reference star for photometric com-

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parisons with the variable, when they do not differ above 1 or 2 magnitudes in brightness."

"49. δ *Cephei.* Argelander considers this the most regular of all known variables, and has given for its period 5^{d} 8^{h} 47^{m} $39^{s}\cdot5$. In 1851, Mr. Johnson made a series of photometric measures of δ *Cephei* with the heliometer, which are given in Vol. xii. of the *Radcliffe Observations.* He thence deduced for the epoch of maximum, 1851, Aug. 22·84, and the period, 5^{d} 6^{h} 42^{m} $18^{s}\cdot4$, which has been adopted in the table. Either period will reconcile distant observations equally well, but that deduced by Mr. Johnson was more in harmony with the results of his consecutive series than Argelander's. The interval between maximum and minimum is 2·95 days."

"53. *R Cassiopeiæ.* This star was first observed by Mr. Johnson with the transit instrument on 1850, Nov. 29, and recorded as of the 6·5 mag. In 1852 it was several times looked for, but not seen, and accordingly supposed variable, but not proved to be so till September 1853, when I found it sufficiently bright (8·5) to bear observing with tolerable illumination. It rapidly diminished, falling through 3 entire magnitudes in about 40 days. In May 1854 it as rapidly increased, till about the end of June, when it was a fine flashing 7th mag., *vividly red*, forming a striking contrast to the white stars of similar magnitude in its neighbourhood. It occupied about 190 days in gradually diminishing to the 11th mag., when it began to waver, and show much unsteadiness till its disappearance, about the middle of Feb. 1855. After remaining invisible for 60 or 70 days, it reappeared as an extremely faint and hazy-looking object, which, when adjacent minute points of light were quite distinct, always seemed to be out of focus. At its last maximum, in September 1855, it was of a deep rich red or crimson. In comparing it photometrically by the method of reduced apertures with the two white stars 8307 and 8326 B.A.C. I learnt a curious fact. When *R Cassiopeiæ* was unmistakeably brighter than the former, and estimated exactly equal to the latter of these two stars, on gradually reducing the aperture of my object-glass, the variable was the first to vanish, however frequently the measure was repeated. Hence it appears, that of two stars, apparently equal in size or brightness, but one white and the other red, the white one is visible through a smaller aperture than the red one. It has since occupied nearly four months in diminishing to the 9th mag. *R Cassiopeiæ* is a double star; the companion being about $0'\cdot8$ np. 1^{s}, of the 11th mag. and not variable. On account of its intense colour, this is unquestionably the most remarkable variable yet found at this Observatory."

Mr. Pogson concludes his paper with a detailed account of the method of observation practised by him.